SEMESTER EXAMINATION, DECEMBER, 2025

Course Name: - B. Tech. (ECE) **Semester: - III[rd]**

Paper Name: - Electronic Devices **Paper Code: - NEC-302**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory.**
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks.**
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks.**

Section – A
Multiple Choice Questions

1. Answer all the following questions. **5x3 =15**

1. A Zener diode is mainly used for:

(a) Amplification (b) Rectification

(c) Voltage regulation (d) Oscillation

2. In a BJT, the emitter is:

(a) Lightly doped (b) heavily doped

(c) Undoped (d) Intrinsic

3. JFET is a:

(a) Current controlled device (b) Voltage controlled device

(c) Power device (d) Digital device

4. LED works on the principle of:

(a) Thermionic emission (b) Photoelectric effect

(c) Electroluminescence (d) Avalanche breakdown

5. Cut-off region of BJT corresponds to:

(a) Both junctions forward biased (b) Both junctions reverse biased

(c) Emitter-base forward, collector-base reverse (d) Emitter-base reverse, collector-base forward

Section – B
Short Answer Questions

2. Answer any five of the following questions. **5x7=35**

i). Explain the working of Zener diode with neat diagram and characteristics.

ii). Describe construction, working and characteristics of NPN transistor.

iii). Explain JFET construction, working and drain characteristics.

iv). Define Zener breakdown. What is the function of base in BJT?

v). what is LED? Mention one application. What is biasing?

vi). Derive the relationship between the different current gains of a BJT and explain the concept of the depletion region.

vii) Classify the types of semiconductor and its suitable example?

Section - C
Descriptive Questions

3. Answer any two of the following question. **2x10=20**

i) Explain the energy band theory of solids. On the basis of this theory, distinguish clearly between conductors, semiconductors, and insulators. Also explain the effect of temperature on the conductivity of semiconductors?

ii) Describe in detail the construction, working principle, and V–I characteristics of a PN junction diode. Explain the concepts of depletion region, barrier potential, forward bias, and reverse bias. Also mention important applications of a PN junction diode?

iii) A Zener diode with a Zener voltage of **12.4 V** is used as a voltage regulator.

The input supply voltage is **24 V**, the series resistor is **940 Ω** and the Load resistor is 2K**Ω.**

Calculate:

(a) Zener current

(b) Load current

(c) Power dissipated by the Zener diode

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